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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Yoshifumi NOGE et al.

Serial No.: 10/634,551 Group Art Unit 1774

Filed : August 5, 2003 Examiner B.H. Hess

For : RECEIVING PAPER FOR THERMAL TRANSFER RECORDING AND MANUFACTURING METHOD THEREOF

REPLY UNDER 37 C.F.R. §1.111

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November 27, 2006

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S I R:

In response to the Office Action dated May 26, 2006, applicants respectfully request reconsideration and further examination of the above-identified application for the reasons set forth below.

Claims 1 - 7, all directed to a receiving paper for thermal transfer recording, are in the application. Of these, claim 1 is independent; claims 2 - 7 are directly or indirectly dependent on claim 1. Claims 1 - 3 and 5 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. patent No. 5,631,076 (Hakomori et al.), either alone or taken with U.S. patent No. 5,508,108 (Tokiyoski et al.), both newly cited. Claims 1 - 7 have been

rejected on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims 1, 5 and 12 of U.S. patent No. 7,034,856 in view of Hakomori et al.

In response to the obviousness-type double patenting rejection, attention is respectfully directed to the terminal disclaimer attached hereto. It is believed that this terminal disclaimer fully overcomes the double patenting rejection. See M.P.E.P. §804.02.

With reference to the rejection of claim 1 as unpatentable over Hakomori et al., alone or taken with Tokiyoski et al., it is submitted that claim 1 distinguishes patentably over these references, whether considered separately or together, in reciting that

> "the ink receiving layer is formed by a method comprising:
>
> "providing a coating of an ink receiving layer forming liquid comprising a resin emulsion overlying the paper substrate, the emulsion having a minimum filming temperature; and
>
> "heating the coating of ink layer forming liquid ***to a temperature not less than the minimum filming temperature*** of the resin emulsion" (emphasis added).

The ink-receiving layer thus defined in product-by-process terms is not disclosed or suggested in either of the applied references; and as discussed in applicants' previous Amendment (filed April 25, 2006), the receiving papers of the claimed invention, including a receiving layer so produced, are characterized by advantageous properties as compared to those in which the receiving layer forming liquid coating is only heated to a temperature below the minimum filming temperature (MFT) of the emulsion, as demonstrated

by the Examples and Comparative Examples set forth in applicants' specification, which show that papers produced with the recited heating step have better resistance to abrasion, alcohol, gasoline and water than papers produced with heating only to a temperature below the MFT.

The Office Action (at p. 2) dismisses the objective evidence of these Examples and Comparative Examples with the assertion that "the degree of heating is not the only variable. In particular, the formulations employed in the Comparative Examples are different from the Representative formulations."

Example 4 in Applicants' specification describes, at paragraph [0080],[1] an ink receiving layer forming liquid (4) containing 20 parts of an "Aqueous emulsion of acrylic-methacrylic copolymer (solid content: 45%, MFT: 79°C., Tg: 85°C.)," and states [0077] that "The resultant coating was heated; the highest temperature of the coating of ink receiving layer material was 95° C. in this case."

Comparative Example 1 describes [0113] an ink receiving layer forming liquid (8) containing 15 parts of an "Aqueous emulsion of acrylic-methacrylic copolymer (solid content: 45%, MFT: 79°C., Tg: 85°C.)," and states [0077] that "The resultant coating was heated; the highest temperature of the coating of ink receiving layer material was 45° C. in this case."

Applicants submit that Example 4 and Comparative Example 1 of their application, taken together, provide a proper basis for comparison of the results obtained with and without "heating the coating of ink layer forming liquid to a temperature not less than the minimum filming temperature of the resin emulsion," and, therefore, that the advantageous results are attributable to the

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[1] Citations to applicants' specification are to numbered paragraphs of application publication No. U.S. 2004/0063579 A1.

quoted heating step and, as such, are entitled to weight in determining the patentability of the claimed invention.

In addition, the specification at [0043] states that

> "The ink receiving layer forming liquid for use in the present invention includes a resin emulsion. In a manufacturing process of forming this ink receiving layer, ***after an ink receiving layer forming liquid is coated on a substrate to provide a surface coating of ink receiving layer material, the ink receiving layer is manufactured by using a process in which the temperature of the surface coating of ink receiving layer material is heated to a temperature not less than a MFT of the emulsion***. MFT means a minimum filming temperature, and the emulsion forms a continuous film when the emulsion is heated to a temperature not less than the MFT thereof. When the temperature of the emulsion is not greater than the MFT, the emulsion does not form a continuous film, even if a solvent of the emulsion evaporates. It is believed that the same is true for the manufacturing process of the ink receiving layer. And even when the ink receiving layer forming liquid is coated on the substrate and then dried to evaporate the solvent of the emulsion, the emulsion forms a discontinuous layer, if the drying temperature is lower than the MFT of the emulsion. A continuous film can be formed by using a process in which the temperature of the surface coating of ink receiving layer material is controlled to be not less than the MFT of the emulsion. It is preferable to perform the process in which the temperature of the surface coating of ink receiving layer material is controlled to be not less than the MFT of the emulsion,

just after drying process (evaporation of the solvent of the emulsion). By using this method, the manufacturing process can be simplified" (emphasis added).

Until the coating of ink receiving layer material has the highest temperature, there are a process wherein water completely evaporates at a temperature not higher than the MFT and a process wherein the temperature rises after the water completely evaporates. In the present invention, the process wherein water completely evaporates is "***(after) an ink receiving layer forming liquid is coated on a substrate***" and the process wherein the temperature rises after the water completely evaporates is "***a process in which the temperature of the surface coating of ink receiving layer material is heated to a temperature not less than a MFT of the emulsion.***"

In Example 4, after the process of evaporating the water (a fixed temperature is kept until the water completely evaporates, the coating of ink receiving layer material is heated to have a temperature of 95°C higher than MFT 79°C, and in Comparative Example 1, the coating of ink receiving layer material is just heated to have a temperature of 45°C, lower than MFT 79°C. These control the rising temperature after the water completely evaporates.

At col. 17, lines 12-26, Hakomori et al. states:

"The polymeric mixture was charged in an agitator (trademark: Kenmix Aiko PRO, made by Aikosha Seisakusho), and agitated at an agitating rate of 490 rpm for 15 minutes to bubble the polymeric mixture. The resultant bubbled coating liquid had a bubbling ratio of 4.5.

"Immediately after the bubbling, the resultant bubbled polymer coating liquid was coated in a dry amount of 10 g/m^2 on a front surface of a substrate sheet consisting of a fine paper sheet having a basis weight of 75 g/m^2 by using an applicator bar, ***and the resultant coating liquid layer was dried at a temperature of 110°C. for 5 minutes, to form an ink-receiving porous polymer coating layer. The resultant hot melt ink thermal transfer recording sheet*** was conditional [*sic*] at a temperature of 20° C. at a relative humidity of 65% for one night and then subjected to the following tests" (emphasis added).

That is to say, in Hakomori et al. the step of drying at a temperature of 110°C for 5 minutes" resulted in an ink-receiving porous polymer coating layer of a hot melt ink thermal transfer recording sheet.

The porous polymer coating layer is a resin layer receiving an ink after drying, and receives a hot melt ink. The polymer coating layer is foamed to have pores, and at the ink is buried therein so as not to leave therefrom.

Therefore, Hakomori et al is not supposed to form a continuous layer as the present invention does, which heats the layer at a temperature not less than MFT to strengthen the layer.

Hakomori et al. foams the polymer coating layer to have pores on the surface thereof such that the ink does not leave therefrom. The present invention does not include foams, although it may include hollow particles (not foams) so as to be cushioned and heat-insulating. Therefore, Hakomori et al. and the present invention are quite different from each other.

Claims 2, 3 and 5, being dependent on claim 1, are submitted to distinguish patentably over the references in like manner.

It is noted that claims 4, 6 and 7 have been rejected only on the above-discussed obviousness-type double patenting ground which is overcome by the terminal disclaimer attached hereto.

For the foregoing reasons, it is believed that this application is now in condition for allowance. Favorable action thereon is accordingly courteously requested.

Respectfully,

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I hereby certify that this paper is being deposited this date with the U.S. Postal Service as first class mail addressed to Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450

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